

Monitoring and Evaluation Report
Grand Valley Unit
Colorado River Salinity Control Project
2010

*USDA-NRCS
GRAND JUNCTION*

IWM MONITORING & EVALUATION REPORT

**STEVE WOLTJER, USDA-NRCS, DISTRICT CONSERVATIONIST – GRAND JUNCTION
WAYNE GUCCINI, MESA CONSERVATION DISTRICT, IWM SPECIALIST**

WILDLIFE MONITORING & EVALUATION

**ED NEILSON, USDA-NRCS, RESOURCE CONSERVATIONIST – GRAND JUNCTION
RUSSELL KNIGHT, USDA-NRCS, WILDLIFE BIOLOGIST – GRAND JUNCTION**

EXECUTIVE SUMMARY GRAND VALLEY 2010

HYDROSALINITY -

- ◆ The project plan is to treat approx. 60,000 acres with improved irrigation systems.
- ◆ To date 42,773 acres have been treated with improved irrigation systems¹.
- ◆ The project plan is to reduce salt loading to the Colorado River system by 132,000 tons of salt.
- ◆ In FY 2010, salt loading has been reduced by 458 tons of salt per year as a result of installed salinity reduction practices.
- ◆ The cumulative salt reduction applied is 135,009 tons/year, or 102 percent of the goal.

¹ Note: The 42,773 acres includes an estimated 15% of the total acres that have been treated a second time to a higher level of irrigation and salt savings efficiency over the course of this salinity project. The net number of total acres treated at least one time is 36,357.

COST-EFFECTIVENESS -

- ◆ The planned cost per ton of salt saved with FY 2010 contracts (one year) is \$121.07/Ton. This figure is calculated as follows:

$(FA + TA = \text{Total Cost}) \times \text{Amortization factor} = \text{Amortized cost}$

$\text{Amortized cost} / \text{Tons salt reduced} = \text{Cost/Ton}$

FA = Total dollars obligated in EQIP and Parallel Program (including wildlife)

Amortization for 2009 = 0.0683

TA = technical assistance cost: $(FA \times 0.67)$

HYDRO SALINITY MONITORING AND EVALUATION

Introduction

The Natural Resources Conservation Service (NRCS) has been placing improved irrigation methodology with selected cost-sharing to cooperators since 1979 through the Colorado River Salinity Control Program. The Colorado NRCS in the Grand Salinity Control Program Unit completed irrigation monitoring on a variety of improved irrigation systems for the crops commonly grown to determine the effectiveness of the salinity control programs in meeting planned goals. Irrigation in the Mesa County area is characterized by mostly gravity-fed systems installed on heavy, clayey soils derived from a marine shale formation (Mancos shale) that is very saline. The intake rates of the soils are generally low to medium. Plentiful and inexpensive irrigation water coupled with the heavy clay soils, long irrigation set times and excessive flow rates continue to be the norm. This leads to deep percolation losses of water and low application efficiencies. The excess water from deep percolation contacts the underlying Mancos shale and subsequently loads salt to the Colorado River. Deep percolation is considered to be the primary indicator of the effectiveness of the irrigation application.

A variety of irrigation systems were evaluated including earthen ditches with earth feeder ditches, earthen ditches with siphon tubes, concrete ditches with siphon tubes, ported concrete ditches, pipeline to gated pipe, side roll sprinklers, and micro spray. Crops included alfalfa, corn, small grain, dry beans, orchards, grapes, onions, pasture, and vegetables. This monitoring took place throughout the entire Salinity program period from 1979 to 2003. Data are compiled for 213 site years of measured irrigation inflows, outflows, crop consumptive use, precipitation, and deep percolation.

The data indicate that the salinity projects in Grand Valley are typically achieving a deep percolation reduction of at least 10 to 15 inches for each acre treated which

meets or exceeds the 8 inches of deep percolation reduction estimated in the original project reports.

Areas with a greater conversion to sprinkler or micro spray will be at the 15 inch reduction and areas with predominantly flood irrigation will be at the 10 inch reduction. Areas that are converting unimproved flood systems will have deep percolation reductions in the 27 to 32 inch range. Areas that are converting very old systems with limited improvements, will most likely be somewhere between the higher values and the lower values, but probably closer to the 10 to 15 inch reduction than the 27 to 32 inch reduction.

NRCS Irrigation Efficiency Standards for Evaluations

TYPE OF IRRIGATION SYSTEM	% OF MONITORED EFFICIENCY
Open ditch	35%
Open ditch w/ siphon tubes	40%
Concrete ditch w/siphon tubes	50%
Gated pipe	50%
Underground pipe & Gated pipe	50%
Underground pipe/Gated pipe/Surge	55%
Center Pivot Sprinkler	90%
Big Gun Sprinkler	70%
Side roll Sprinkler	75%
Micro spray	90%
Drip Irrigation	95%

2010 Highlights

Beginning in 2004, NRCS, in cooperation with the Mesa Conservation District and the Colorado State Conservation Board began a program designed to place emphasis on Irrigation Water Management (IWM). During 2006, a full-time IWM position was made available to increase emphasis on IWM. Visits to check and certify IWM were made on 136 farms during 2010.

Land Use	System type	Acres IWM reported
Row crops, Hay, Grass	Gated Pipe	1436
Orchards	Micro Spray	163
Vineyards	Micro Drip	23
Row Crops	Surge	42
Grass	Solid Set Sprinkler	5
Melons	Underground/Drip	4

The Mesa Conservation District has added two district technicians to help with the backlog of engineering practices that needed to be surveyed and designed. NRCS has added an engineer to help with the workload. Engineering equipment is being upgraded (GPS, Auto-CAD, etc) to help speed up survey and design for landowners.

For the coming irrigation season, the Grand Valley project area is increasing efforts to expand the use of sprinklers for smaller acreages. Smaller, subdivided parcels are causing significant problems in the traditional tail water delivery and disposal methods. This is causing water to flow more slowly and stand in ditches for longer periods of time. This problem could cancel out some of the positive deep percolation reduction effects in the program. Sprinkler systems could help to solve that problem.

One of the main drawbacks to the use of sprinklers has been the need to install pumps, as there is no gravity pressure available. Other alternatives will be studied this irrigation season. There is increasing interest in small-scale center pivots for use on larger fields in the Grand valley. CSU has received a grant to carry out irrigation

audits for small acreages (10 acres or less).

Wayne Guccini is working with local students to use ball probes to check irrigation practices at home. He will also start working with small land owners to improve water management on irrigated pastures and hayland.

Urban Use of Irrigation Water

Although not a part of the EQIP and the monitoring and reporting requirements of the program, there have been concerns about the potential overuse of irrigation water by suburban and urban users, both newcomers to the area as well as homeowners familiar with the area and the local conditions. In late 2004, the Mesa Conservation District received a grant to study the effects of ex-urban and suburban development on irrigation water use and deep percolation. Monitoring and study of this segment of land use continued in 2006, and was completed at the end of the irrigation season.

Final report of results has been published. The project goal was to characterize the deep percolation from urban irrigation, and compare it to historic levels of deep percolation from agricultural irrigation.

The report shows a wide range of deep percolation on small acreage and urban lot-size units, similar to the variability found in traditional farmland. It was thought that overall water use would be reduced due to an increase of impervious areas such as streets, curbs and gutters, and rooftops in these urbanizing areas. The study found that the conversion of land use from agricultural land use to urban land use reduces water use by about 74 percent and deep percolation as much as about 90 percent. Estimated reductions in salt loading were as much as 92 percent.

Conservation District and CSU Extension Projects

Mesa Conservation District working with CSU Extension conducted a deficit irrigation project in peaches. Withholding water and deliberately stressing peaches can

actually save water and not hurt the crop. In agriculture, water savings are usually not possible because the crop is going to use the same amount of water no matter how efficient the system but by stressing the crop water savings are possible. On one site 9.6 inches of water was saved, \$10 per acre saved in pumping costs, with a possible reduction of 668 lbs of salt per acre put into the river with no change in the crop. On the second site there was reduction of water used of 21 inches, \$22 savings in pumping costs, with a possible reduction of salt to the river of 1467 lbs per acre. There was a reduction in peach size at this site. This project will be continued in 2011.

Mesa Conservation District and CSU Extension are also working with the Grand River Mosquito Control District. Over irrigation and poor field drainage not only contribute to deep percolation of salts but is also a major contributor to mosquito habitat. The mosquito district has a unique advantage to contacting landowners where the other two organizations can help with proper irrigation techniques thus helping all parties meet their goals.

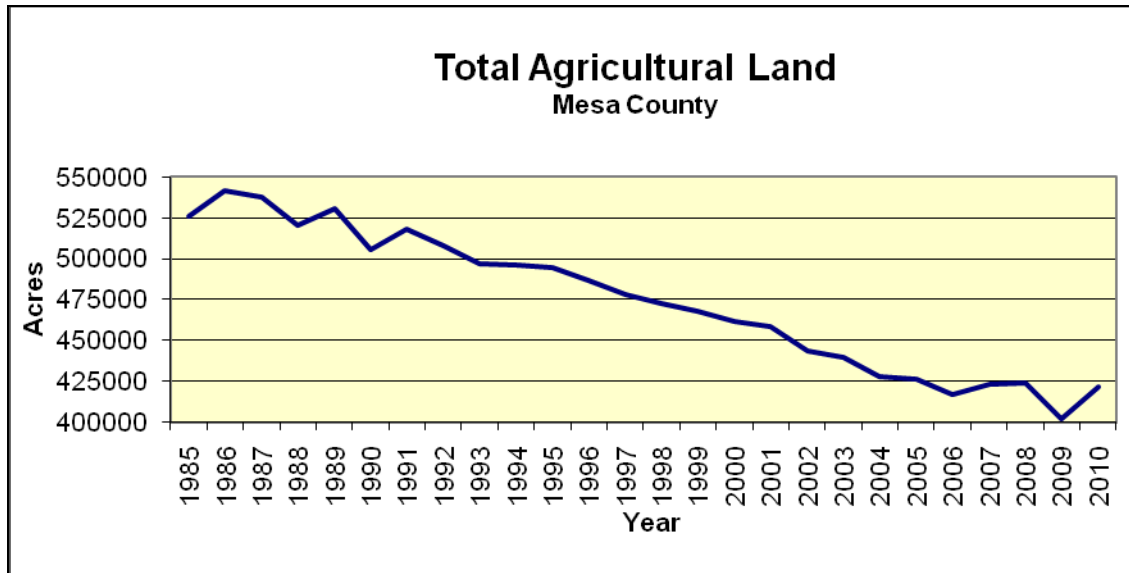
Demographic and Area changes in the Grand Valley

For several years it has been reported that parcel and field sizes are changing in the Grand Valley, and that this has begun to limit potential applicants and eligible property to further implement the Grand Valley portion of the salinity control program.

For 2008, data was gathered and compiled to determine the extent of these changes. During the 25 year period from 1985 to 2006, the data showed a 19.85% decrease in total agricultural acres in Mesa County. Acres included Irrigated farmland, Meadow hayland, Grazing land, and Orchard land. This process was continued and updated through 2010. From 2006 to 2010, the data showed an increase of 1.01% in total agricultural acres (*See chart 1*). New and beginning farmers applying for salinity control programs during those years have increased as well. Data were collected from Mesa County Planning and Development Department subdivision and land development records, and County Assessor records to estimate parcel and ownership size changes, if any for the Grand Valley area.

Additionally, an estimate of parcel size change was determined by utilizing ArcView (GIS) information. Using this data it was determined that the average parcel size in the Grand Valley area remains at under 5 acres.

Chart 1



Recommendations for Future Monitoring and Discussion

- For 2011, effort will continue on all new EQIP and BSP contract recipients to address irrigation water management and proper use of newly installed irrigation systems.
- Emphasis needs to be placed on landowner irrigation scheduling tools and methods such as “checkbook” and field probing for soil moisture observation.
- For 2011, data will continue to be collected and compiled from urban and small acreage sites. The effects of conversion to urban and small acreage land units must be evaluated to assess the effects of the changes on the projected salinity reduction. Many of the areas treated under the program are being converted to smaller 1 to 2 acre parcels. The Grand Valley areas near Grand Junction, Fruita, and Loma are transitioning to these smaller parcels. There appears to be increasing support and transition to smaller parcels in the Grand Valley, in spite of the general community desire for larger lots that

create the appearance of more open space, etc. They continue to be irrigated, but by a new landowner and with different crops, usually hay or pasture and lawn and garden.

- Many of the larger parcels are being subdivided in the 20 acre to 40 plus acre size and remain in some type of crop production, but under a new owner/manager that works a primary job off the farm and may have no previous experience with irrigation.
- Significant problems still exist in the delivery of water in unimproved and outdated laterals and other group delivery systems. There is a need for these groups to incorporate and improve these systems; however it is increasingly difficult for this to occur. Most laterals have doubled or even tripled the number of users on the laterals due to subdivision, and this influx of inexperience has driven more complaints and operation problems. The EQIP program is poorly suited to planning and providing cost share for improving these systems, as participants must be agricultural producers. BSP and AWEPP will be the programs used to address these problems.
- The cost of improving many of these systems exceeds the cost-effectiveness limits for the BSPP and EQIP programs, set at \$60/Ton for BSPP and \$150/ton for EQIP. The recession has had a major impact on landowners. Funding levels will need to increase to get landowners interested in signing a contract under BSPP or EQIP.
- Many irrigation systems improved in the early years of the salinity programs are nearing the end of their practice life. This will need to be addressed as some of these systems will eventually need to be replaced. Some systems are capable of lasting far longer than the stated practice life, e.g. underground pipeline, while other systems have definitely deteriorated. It is important for these systems to remain “on line”.
- The participation level of the program and the treated area completed to date show significant success for both the popularity and the past participation of the program. There is still much interest for improvements in parts of the

Grand Valley dominated by vineyards and fruit crops. For more traditional crops, the treated acreage level is resulting in fewer applications, as the majority of large acreages have been treated. Many applications are received for irrigation improvements for parcels as small as one acre.

- There are opportunities to assist the new and inexperienced land owners through education and training on effective irrigation water management and systems operation. There has been an increase in absentee landowners which is also a challenge.
- Find funding to increase incentive payments on wildlife habitat management to get more interest from landowners.
- The projected salinity reduction for these types of units should be evaluated so appropriate adjustments to cumulative salinity loading information can be made based on measured values.
- Have staff continue to receive training in the latest technology to improve our assistance to landowners
- Knowing that many of the land units may be facing future land use changes due to development requires adjustments to irrigation system designs to provide a salinity reduction benefit with the current operation. Designs must take into account further and future development, which drives up the current construction costs.
- Cost effectiveness of the Grand Valley program is being affected by the above construction cost increases and by the reduction of the sizes of parcels made available for the cost share programs.

Grand Valley Salinity Control Project 2010 Status Inventory Report – August 31, 2010

Introduction:

The Grand Valley is located in west central Colorado along a reach of the Colorado River between the towns of Palisade and Mack and includes Grand Junction, the

largest city in western Colorado.

The Grand Valley Salinity Control Project is a component of the Colorado River Basin Salinity Control Project authorized by the Colorado River Basin Control Act of 1974 (PL93-320) as amended.

The Natural Resources Conservation Service (NRCS) has been placing improved irrigation methodology with selected cost-sharing to cooperators since 1979 through the Colorado River Salinity Control Program and subsequent authorities provided through the Environmental Quality Incentives Program (EQIP).

NRCS Colorado in cooperation with the Colorado State Conservation Board (CSCB) and the Mesa County Conservation District conducted a field inventory and review of irrigated lands and near farm irrigation delivery systems during the spring and summer of 2010. The objectives were to assess the irrigation improvement land treatment and wildlife habitat replacement status of fields within the Grand Valley salinity project, to create a database for analyses, and to develop a process transferrable to other salinity control areas for long term progress tracking and project management. The project accomplishments were evaluated in relation to the Grand Valley Unit project authorization goals.

Key findings of the 2010 survey of the Grand Valley project land treatment status are:

- ◆ The original Grand Valley salinity control project plan was to treat approx. 60,000 acres with improved irrigation systems. The 2010 field inventory shows 47,600 of irrigated land. Land use changes, since 1979, have reduced the acres of irrigated cropland within the project area.
- ◆ Through Fiscal 2009, 42,435 acres have been reported by NRCS as treated with improved irrigation systems¹. The 2010 field inventory observed 44,700 acres (95%) with improved systems. Some acres have been treated without USDA or

Basin States assistance.

- ◆ The project plan set a goal to reduce salt loading to the Colorado River system by 132,000 tons of salt.
- ◆ Through FY 2009, the cumulative salt reduction applied is 134,551 tons/year, or 102 percent of the goal.

1. Note: The 42,435 acres and 134,551 tons/year have been adjusted due to the estimated 15% of the total acres that have been treated a second time to a higher level of irrigation and salt savings efficiency over the course of this salinity project.

Inventory methods:

Personnel from the NRCS State and Grand Junction Area and Field Office, local Colorado State Conservation Board, and Mesa Conservation District staff participated in the inventory. Information was also obtained from irrigation companies and the Bureau of Reclamation. Project area maps were developed using a combination of Mesa County Assessor parcel ownership information and field office case files. Staff brought physical maps to the field, drove irrigation canal and lateral rights-of-way and documented observed field and later irrigation systems. Irrigation systems were observed in the spring and early summer. Systems were categorized by improvements and not by funding source for improvements, i.e. EQIP, Basin States Parallel Program, or self funded.

The inventory was conducted at the field level. Basic information was collected and recorded in the field through on-site visits. Results are shown in Table 1. Field maps were used to develop a geo database and GIS maps for display and analyses. Mesa County 2007 ortho photography available to the field office was used to create the field maps and to provide supplemental information in the event a field or irrigation lateral was not accessible to the field reviewers.

Table 1: ON-FARM IRRIGATED ACREAGE IN THE GRAND VALLEY BY SYSTEM TYPE

OBSERVED FIELD RESULTS BY IRRIGATION METHOD

Irrigation Method	Coverage (acres)	Percent of Total Area Surveyed	Number of Fields
Earthen Field Ditch	2,899.9	6.09%	546
Concrete Field Ditch	7,338.2	15.42%	590
Gated Pipe	32,765.5	68.82%	4005
Surge	498.1	1.05%	21
Sprinklers	2,579.1	5.42%	166
Micro-spray	1,454.5	3.06%	398
Drip	65.3	0.14%	14
TOTAL	47,600.6	100.00%	5740

These figures do not include any planned practices under contract that have not yet been applied. The 2010 inventory resulted in categorization of 94% of the irrigated fields in the Grand Valley salinity project area with improved irrigation systems. No classification of practice condition was done as part of this inventory process.

IRRIGATION LATERAL SYSTEMS BY IMPROVEMENT TYPE

Irrigation lateral treatments were observed and categorized. Information was obtained with assistance from irrigation companies and other agencies. Map analysis was used to characterize untreated irrigation lateral length, shares, and head gate locations. All laterals were mapped from photos. Field checks were completed where possible. Additional field checks will be completed by staff from irrigation districts this fall. The Bureau of Reclamation (BOR) and irrigation districts are providing additional information on head gates, locations and designed flow rates. All irrigated land and water delivery laterals in the Valley including the Grand Valley Canal, Highline Canal system (Grand Valley Users Association), the Palisade Irrigation District, the Mesa County Irrigation District, and the Orchard Mesa area were inventoried. Results are shown in Table 2.

Table 2: OBSERVED OFF and NEAR FARM IRRIGATION LATERAL IMPROVEMENTS

Canal System and Conveyance Method	Length (Feet)	Percent of Total Length
Government Highline	953,721	
Earthen Ditch	0	0%
Concrete Ditch	0	0%
Piped Lateral	953,721	100%
Grand Valley Irr. Co	1,229,385	
Earthen Ditch	104,601	8.51%
Concrete Ditch	399,298	32.48%
Piped Lateral	725,486	59.01%
Orchard Mesa Irr. D.	368,288	
Earthen Ditch	12,040	3.2.7%
Concrete Ditch	53,536	14.54%
Piped Lateral	302,712	82.19%
All Irrigation Co's.	2,551,394	
Earthen Ditch	116,641	4.57%
Concrete Ditch	452,834	17.75%
Piped Lateral	1,981,919	77.68%

The 2010 inventory resulted in categorization of 95.5% of the irrigated laterals in the Grand Valley salinity project area as treated. No classification of irrigation conveyance condition was done as part of this inventory process.

III. Wildlife habitat replacement status.

The USDA Grand Valley Project wildlife habitat replacement goal is 1200 acres as specified by US Department of the Interior memorandum.

During the 2010 field review, 59 wildlife projects, funded by US Bureau of Reclamation and USDA financial assistance programs, were assessed to determine current condition. Based on the assessment, 7 projects with 17.8 acres no longer provide the planned wildlife habitat benefits. There are currently 710 acres of projects that meet planned wildlife habitat replacement requirements. USDA currently has 19 wildlife contracts with 142 planned acres. Planned and applied wildlife habitat replacement is 71% of the original project goal. However, since the Grand Valley has seen 12,400 acres converted to urban or other non agricultural land uses, the pro-rated wildlife habitat accomplishments are proportional to the current project area agricultural land.

IV. Recommendations and Proposed Actions

Based on the 2010 inventory and analysis the USDA on farm goals for the Grand Valley project are substantially complete. The Grand Valley Unit Project Environmental Assessment, completed in December of 1977, predicted levels of on farm and off farm treatment and effects.

USDA on farm objectives as documented "On Farm Program for Salinity Control – Final Report of the Grand Valley Salinity Study" – December 1977 set a goal for USDA to achieve 130,000 tons of salt reduction.

As of fiscal 2009, the reported salt control for the Grand Valley project was 134,551 tons or 102% of the Grand Valley Unit USDA goal. The original project assessment set a goal of 40% of the Grand Valley laterals to be treated. This goal has also been met.

The 2010 Grand Valley project inventory identified 546 fields comprising 2900 acres serviced by earthen field irrigation ditches and classified as untreated. This represents approximately 6% of the irrigated lands within the Grand Valley project. The average field size is 5 acres. Many of these fields are within urban and developing subdivisions, isolated areas or are not currently farmed.

852 acres or 71% of the original wildlife habitat replacement goal has been planned or established. Current efforts targeting riparian corridor habitat projects using USDA and partner funding are ongoing. Outreach activities such as riparian buffer workshops and cooperation with the Mesa land Trust are scheduled over the next two years to accelerate the rate of wildlife habitat replacement. Activities are under way with the UCEC Meeker Plant Materials Center. Demonstration plantings have been scheduled with local producers. Due to changing land use and the objective to develop enduring, high quality wildlife habitat, the USDA encourages the BOR or other entities to purchase or place easements on suitable land and use USDA and / or BSP funds for habitat restoration practices. NRCS easement program opportunities are also being pursued.

NRCS Colorado is establishing a two year timeframe to be implemented during Fiscal Years 2011 and 2012 to accept applications and develop EQIP contracts to close out the formal on-farm USDA portion of the Grand Valley Unit Salinity Control Project designation. NRCS staff will conduct outreach through consultation with partner Agencies, targeted mailings, a public information campaign and a public meeting to encourage remaining potential participants to apply for the current EQIP salinity program in the Grand Valley. NRCS will continue to provide technical support for current the Basin States Program efforts to improve remaining irrigation laterals and other projects during this timeframe and thereafter as recommended by the Colorado River Salinity Control Forum.

Beyond the fiscal 2012 EQIP contracting cycle General EQIP and other NRCS Program funding will be used to address water quality, wildlife and other resource

concerns in the Grand Valley. All current salinity program projects and the derived benefits can be served under these Programs. In consultation with the Salinity Control Forum and the BOR, NRCS proposes to implement a salinity control bonus incentive payment process in the Grand Valley to provide financial assistance for future water quality projects with salinity and wildlife habitat benefits. General EQIP combined with partner funding is proposed to be used for the bonus incentive payment. Discussions are also underway with the Forum's Work Group to develop strategies for improving outdated and lower efficiency irrigation systems.

The USDA-NRCS recognizes the extraordinary efforts and partnerships put forward over the past 30 years in implementing the Grand Valley Salinity Control Project. The Agency proposes an appropriate closing report and celebration to acknowledge the success of the project for Upper and Lower Basin water users. Appropriate public notice and meetings will be used to close the USDA requirements of the Grand Valley Unit environmental analysis.

EXECUTIVE SUMMARY- WILDLIFE

GRAND VALLEY 2010

WILDLIFE

History and background:

The Grand Valley Unit is located in west central Colorado adjacent to the Colorado-Utah state line and includes the entire irrigated area of the Grand Valley North of the Colorado River and the area served by the Orchard Mesa Irrigation District on Orchard Mesa. Added to the Grand Valley Unit in 2006 are the DeBeque and Whitewater Units. The DeBeque Unit is located 24 miles east of Grand Junction adjacent to the Colorado River. The Whitewater Unit is located 7 miles south of Grand Junction adjacent to the Gunnison River. The Grand Valley is characteristic of arid, cold desert ecosystems common to western Colorado and eastern Utah. Historically, the Grand Valley Unit was dominated by desert vegetation communities.

Narrow wetlands and riparian zones were located along the Colorado and Gunnison rivers as well as several natural washes. The present mosaic of habitat types (agricultural, riparian, wetland, and desert shrub) is a result of current irrigation systems and practices. With the advent of irrigation and associated waste water return flows and seepage, the natural vegetation has changed. A sparse, saltbush desert community has been converted to crops and habitat types such as wetland, riparian, willow and cottonwood, tamarisk, tall wheatgrass, or a mosaic of these cover types. Habitat types other than cropland are restricted to areas unsuitable for agriculture, such as canal and lateral banks, fence rows, washes, irrigation return flows and drains, roadsides, and other low-lying areas.

Agricultural areas are composed of orchards, pastures, and crops. Crops grown vary from peaches, grapes and cherries, to alfalfa, corn and small grains. All crops are entirely dependent upon irrigation for production. The area originally comprised about 66,000 acres of agricultural land; however, urban and commercial development over the last 32 years has reduced the agricultural area to

approximately 47,600 acres. Areas west and north of Fruita, Loma, and Mack have large irrigated agriculture fields. Other areas in the unit are characterized by small fields associated with ranchettes and growing specialty crops.

The size of most program participant's properties is small (1-20 acres). Many landowners and participants are moving from the city to recently created small parcels. The Grand Valley area is beginning to see a shift in how landowners view and manage the land. Landowners purchase these parcels for open space, privacy, views, and a rural life style. They manage the parcels as "extra-large lots", rather than farms. Many of these landowners are still interested in improving their land and irrigation but not just for agricultural reasons.

Impacts to wildlife and habitat in the Grand Valley Unit are addressed in the Grand Valley Environmental Assessment, prepared jointly by the U.S. Bureau of Reclamation (BOR), U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), and the U.S. Fish and Wildlife Service (USFWS). The Environmental Assessment determined 4000 acres of wildlife habitat would be lost due to improvement of on-farm and off-farm irrigation systems. Based upon analysis of the potential impacts, the assessment and subsequent agreements by the agencies required replacement of the 4000 acres of wildlife habitat. Seventy percent of the replacement requirement was assigned to the BOR. The remaining thirty percent, or 1200 acres, was assigned to the NRCS. In 1993, The BOR purchased 355 acres of property for development of wildlife habitat to augment the NRCS goal of 1200 acres. In previous Monitoring and Evaluation reports for the Grand Valley it was stated that the BOR purchased nearly 400 acres to be credited to the NRCS. A review of documentation shows only 355 acres were purchased, resulting in an NRCS replacement goal of 845 acres.

Wildlife habitat replacement in the DeBeque and Whitewater Units will be determined on a site by site basis by an NRCS biologist. Habitat acres that will be negatively impacted by salinity projects in these units will be added to the remaining habitat

replacement goal of 845 acres set for the Grand Valley Unit.

Over the last 32 years, salinity and wildlife habitat improvements projects have been cost-shared by several different programs as documented in table 1. Note that there are some overlaps between programs. Additionally, wildlife habitat has been created in the Grand Valley Unit through the USDA Wildlife Habitat Incentives Program (WHIP). To date, habitat developed with the WHIP program has not been considered salinity project habitat replacement. It is addressed in this document for information purposes.

Table 1. Salinity Control Programs in the Grand Valley Unit

Grand Valley Salinity Control Program (GVSP)	1978 -1989
Colorado River Salinity Control Program (CRSC)	1987 – 1995
Interim Environmental Quality Incentives Program (IEQIP)	1996
Environmental Quality Incentives Program (EQIP)	1997 -2010
Colorado River Basin States Parallel Program (BSPP)	1998 – 2010

Beginning in 2001, additional funding for wildlife projects that would contribute to habitat replacement goals was made available through the Basin States Parallel Program (BSPP). All BSPP wildlife projects are selected through a ranking process developed by an interagency committee. Projects funded with BSPP funds may be located outside of the Grand Valley Unit.

In 1991, the Grand Valley Unit began tracking planned and applied wetland wildlife projects, identifying type and value changes based upon the Avian Richness and Evaluation Methods for wetlands of the Colorado Plateau (AREM) and Circular 39 from the USDI. Existing wetlands impacted by wildlife conservation practices are evaluated using these methods to establish an existing habitat value. The impacted or created wetlands are re-evaluated after wildlife conservation practices are installed using the above criteria to determine applied wetland habitat values. Impacted wetland values from irrigation conservation practices have not been

documented over the last 31 years. Any improved wetland values are based on projects that were targeting wildlife habitat improvement and do not reflect any negative values from irrigation impacts.

Current methods

In the Grand Valley Unit wildlife habitat replacement progress is tracked by acres. Additionally, wetland habitat value changes are assessed using AREM as described above. In an interagency meeting on December 10, 2004 it was agreed, that only habitat development currently on the ground will be credited for habitat replacement. 845 acres of habitat replacement assigned to NRCS will need to be on the ground when the project is finished. At project end, past NRCS habitat development that no longer exists (due to a variety of reasons) will not be credited to NRCS. The process of reporting and field verification of program results and records will continue for the remainder of the program. During 2010 several acres were removed from the total due to loss of habitat values because of recent development in the area resulting in a net change of -6.45 acres.

For the duration of the salinity program, the type of wildlife improvement practices has remained consistent. Practices include ponds, fencing, grass and forb establishment, brush (tamarisk control) management, and tree and shrub establishment. Pond construction includes membrane lining at all locations except where the pond is at equilibrium with an existing water table. To address Colorado River endangered fish concerns, all ponds are constructed with fish screens on outlet structures (unless the pond will be drained to less than 1 foot depth during winter), and, water depletion loss is calculated and reported to the U.S. Fish and Wildlife Service for their review.

Results

Progress from wildlife projects, both planned and applied, is updated yearly in a spreadsheet maintained by the NRCS Grand Junction Field Office. This data represents the final audit and update for all wildlife projects in the Grand Valley Unit, and are verified from field visits performed by a wildlife biologist.

Salinity and wildlife habitat improvements have been cost-shared by several different programs. Progress in acres of wildlife habitat replacement by program is illustrated by Graph 1. Table 2 summarizes the applied data for all salinity programs. Table 3 is a summation of dollars spent on wildlife projects with salinity program funds. Table 4 summarizes the wildlife habitat replacement acres and funding for the BSPP program. Table 5 summarizes the wildlife acres and funds for the WHIP program spent in the salinity area. WHIP acres applied in Table 5 are not included in Table 2. Wetland data collected over the last 16 years for all salinity programs and WHIP is summarized in Table 6. Table 7 and Table 8 reflect expected impacts to wildlife and wetlands in the DeBeque and Whitewater Salinity Units. Table 9 is a summary of all wildlife mitigation efforts for 2010 for the Grand Valley Unit.

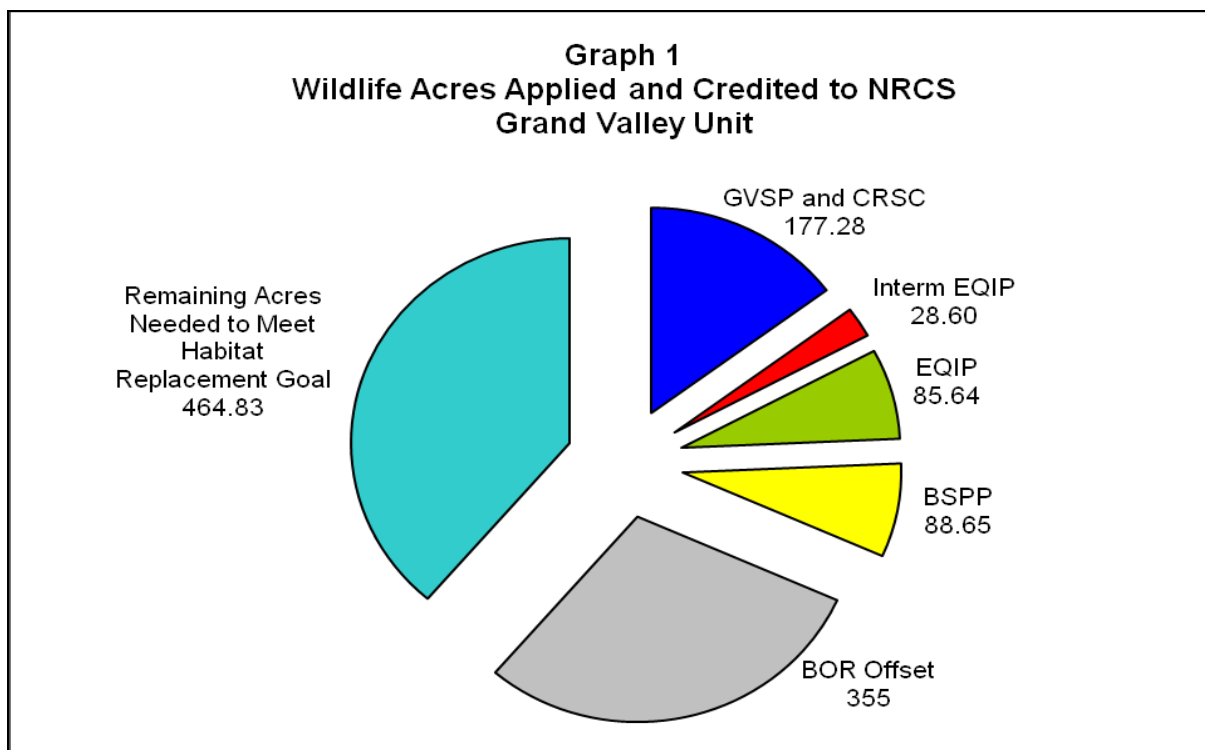


Table 2. Summary of Wildlife Habitat Planned and Applied (All Salinity Programs)

Wildlife habitat replacement acres planned 1997-2010	1,616.35
Habitat replacement acres applied and existing 1978-2010	380.17
Bureau of Reclamation Offset	355
Remaining acres needed to meet habitat replacement goal	464.83

***This does not include 16.90 acres applied with WHIP**

Table 3. Funding for Wildlife Habitat Replacement Projects (All Salinity Programs)

Funds obligated to wildlife projects 1978-2010	\$2,549,727.53
Funds spent on wildlife projects 1978-2010	\$855,056.14
% of total salinity obligated funds that are obligated to wildlife projects through 2010	7.6%
% of total salinity obligated funds spent on wildlife projects through 2010	2.5%

This does not include WHIP

Table 4. Summary of Wildlife Habitat Projects Planned and Applied with BSPP Funds

Acres planned 2001-2010	290.10
Acres applied 2001-2010	88.65
Funds Obligated to wildlife projects 2001-2010	\$638,395
Funds Spent on Wildlife projects 2001-2010	\$178,040

Table 5. Summary of Wildlife Habitat Projects Planned and Applied with WHIP Funds

Acres planned 2001-2010	190.40
Acres applied 2001-2010	16.90
Funds Obligated to wildlife projects 2001-2010	\$76,342
Funds Spent on Wildlife projects 2001-2010	\$34,708

Table 6. Wetland Data from 1991 to 2010

Cumulative acres impacted 1991-2010 (salinity programs)	48.09
Net AREM change 1991-2010 (salinity programs)	26.49
Cumulative acres impacted 1991-2010 (WHIP)	9.00
Net AREM change 1991-2010 (WHIP)	2.98

Table 7. Estimated Wildlife and Wetland Impacts in Debeque Salinity Area (currently no applied irrigation improvements in this area)

Total wildlife habitat acres expected to be impacted 2007-2010	2.80
Cumulative wetland acres expected to be impacted 2007-2010	0.30
Net AREM expected change 2007- 2010	(0.17)

Table 8. Estimated Wildlife and Wetland Impacts in Whitewater Salinity Area (currently no applied irrigation improvements in this area)

Total wildlife habitat acres expected to be lost 2007-2010	3.20
Cumulative wetland acres expected to be impacted 2007-2010	0.00
Net AREM expected change 2010	0.00

Table 9. Summary of Wildlife Mitigation Efforts

Habitat replacement acres planned (EQIP)	21.4
Habitat replacement acres Applied (EQIP)	2.3
Funds spent on wildlife projects (EQIP)	\$17,162.81
Habitat replacement acres planned (BSPP)	114.5
Habitat replacement acres applied (BSPP)	16.3
Funds Spent on wildlife projects (BSPP)	\$49,590
Wetland acres improved 2010 (All Salinity Programs)	2.9
Net AREM change 2010 (All Salinity Programs)	0.00

Discussion of Results

Over the last 32 years 5 salinity programs have been utilized to replace wildlife acreage (Graph 1). A majority of the replacement effort has been a result of the CRSC and GVSP salinity programs. The EQIP program has produced 85.64 acres in twelve years. During the first 7 years of the EQIP program, wildlife and irrigation projects for the same landowner were often combined in one contract and there was a high cancellation rate of the wildlife portion of the contract. Since 2004 all wildlife contracts under EQIP are separate contracts and cancellation rates have decreased.

The NRCS replacement effort has resulted in 380.17 acres of wildlife habitat applied and existing (Table 2). These applied and existing acres account for about 25% of all planned projects. NRCS funded projects and the BOR offset of 355 acres has resulted in a total of 715.72 acres of wildlife habitat credited to the Grand Valley Unit. An additional 464.83 acres of habitat replacement is required to achieve the 1200 acre goal. During 2010 135.9 acres were planned for wildlife habitat mitigation and 18.6 acres were applied (Table 9).

Funding of wildlife projects from all salinity programs is outlined in Table 3. To date,

\$855,056.14 has been spent on wildlife projects in the Grand Valley Unit, which is 2.5% of the total obligated funds for all salinity programs. Over the last 33 years, \$2,549,727 has been obligated to wildlife projects in the Grand Valley Unit, which is 7.6% of the total funds obligated to for all salinity programs. During 2010 a total of \$49,590 was spent on wildlife projects (Table 9).

The BSPP program has planned 268.75 acres of wildlife habitat since 2001 (Table 4). Currently 88.65 acres have been applied with this program. During 2010, 114.5 acres were planned and 16.3 acres applied for wildlife mitigation projects under the BSPP (Table 9). A total of \$638,359.09 BSPP funds have been obligated to wildlife projects, with \$178,040.17 spent to date on wildlife projects (Table 4). A total of \$49,590 was spent on BSPP wildlife projects in 2010 (Table 9).

Wildlife projects planned using WHIP funds are outlined in Table 5. The values in Table 5 are not included in either Table 2 or Table 3. Currently there are 190.4 acres planned in the Grand Valley Unit under WHIP and 16.9 acres applied and existing. At this time there have been \$76,342 of WHIP funds obligated in the Grand Valley Unit, and a total of \$34,708 has been spent on wildlife projects.

Since 1991, a total of 48.09 acres of wetlands have been improved through salinity programs in the Grand Valley Unit with a net AREM change of +26.49 (Table 6); however, these values do not reflect any wetlands lost due to irrigation impacts. In 2010, 1 wetland was created with 0 net AREM change (Table 9). Wetlands created in 2009 and 2010 will be evaluated for AREM after 3 years to allow for vegetation to establish and wetland functions to develop.

Wildlife and wetland loss for the DeBeque Unit and Whitewater Unit is documented in Table 7 and 8. These values are expected losses, actual losses will be determined if, and when, irrigation projects are installed and any habitat loss will be added to the wildlife mitigation goal for the Grand Valley Unit. Current expected losses for the DeBeque Unit are a cumulative 2.8 acres and a change in AREM

values of -0.17. Current expected losses for the Whitewater Unit are a cumulative 3.2 acres and no change in AREM values.

Conclusion

Replacement effort for wildlife acres is dynamic as urban development impacts areas that once were managed for wildlife under the salinity programs. Each year wildlife acres are applied throughout the Grand Valley Unit, but acres are also removed as identified by periodic field checks by an NRCS biologist. Effort must be placed upon increasing the interest of landowners to establish and maintain wildlife habitat. Direct contact with landowners that own large parcels or land along natural washes and drainages may be beneficial. With increasing numbers of landowners having small parcels, the salinity program must adjust to accommodate smaller areas. NRCS can utilize these opportunities by showing the benefits of improving small open space parcels for wildlife habitat.

Cancellation rates of EQIP wildlife contracts have decreased with the advent of separate contracts for wildlife projects. Retention rates should also improve as practice lifespan for practices associated with wildlife habitat have increased from 10 years under the GVSP program, to 20 and 25 years under current programs. Retention of applied wildlife habitat acres may also be increased by working with lands that have conservation easements in place. This would entail working closely with land trust organizations to identify possible landowners with conservation easements that are wildlife oriented. Working with Mesa County and the cities of Grand Junction, Fruita, and Palisade to establish projects located in development buffer zones may increase opportunities for wildlife projects with willing landowners. Working with the Colorado Division of Wildlife and Colorado State Parks may provide opportunities on medium sized parcels along the Colorado River corridor in the Grand Valley.